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CHECKLIST OF THE MOTHS OF WALDEN II NATURE PRESERVE, LAKE COUNTY, OHIO (1988–1992) WITH ANALYSES OF ABUNDANCE

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ABSTRACT

The biodiversity of moths at Walden II Nature Preserve in Lake County, Ohio was studied by placing an ultraviolet light trap at the same location each year. The checklist tabulates five consecutive years of trapping (1988–1992) and includes 17,053 specimens representing 502 species. The study began in 1987 and continued through 1996, but only data for 1988–1992 are included here. The checklist is a historical record of the species that were present in 1988–1992 and the techniques used were designed so they can be duplicated in the future. The accumulation of species collected over time illustrates the importance of long-term studies. Species were still being added after ten years of trapping. The Shannon-Wiener Diversity Index for the moths collected in 1988–1992 is 7.1 and the Shannon-Wiener Evenness Index is 0.79. Two hundred twenty of the 502 species are widespread in northeast Ohio, having also been collected in Columbiana, Stark, and Ashland Counties. The less abundant species at Walden II are not less likely to be widespread than the more abundant species at Walden II, except for the singletons. One species of owlet moth that was collected at Walden II is of special interest in Ohio. All specimens collected are deposited at The Cleveland Museum of Natural History, Cleveland, Ohio.

Introduction

The objective of this study was to document the population changes of native moths for ten years at several sites within the drainage basin of the Grand River in Trumbull, Ashtabula, and Lake Counties, Ohio, during gypsy moth invasion and control. This is the sixth in a series of checklists that tabulate the moths collected at each site during 1988–1992.

Over this same period, the population of the gypsy moth increased in the entire drainage basin. Pheromone trap catches of male gypsy moths increased at Walden II Nature Preserve from 43±7(3) per trap in 1987 [mean±standard error (number of traps)], to 71±13(4) in 1988, 158±40(4) in 1989, 72±21(4) in 1990, and 150±50(4) in 1991. Pheromone trapping was discontinued after 1991. Ultraviolet-light-trap catches of male gypsy moths also increased, from 1 in 1987, to 8 in 1988, 43 in 1989, 8 in 1990, 15 in 1991, and 49 in 1992, but noticeable defoliation was not observed at Walden II Nature Preserve.

The overall study provides baseline data on pre-outbreak moth diversity, as well as data on the impact of gypsy moth control agents.

Description of the Surveillance Site at Walden II Nature Preserve

Walden II Nature Preserve is composed of 49 ha of forest and is bordered by Blair Road on the south and the Grand River on the north (Figure 1). The Preserve is situated on the Euclid end moraine on 15–30 m of glacial drift, till, silt, and sand over bedrock (White, 1980, p. 5, Pl. 1).

The light trap at Walden II Nature Preserve was located in Leroy Township in Lake County on the bluff overlooking the Grand River at latitude 41° 43′ 26″ N and longitude 81° 08′ 34″ W (U.S. Geological Survey Painesville, Ohio, 7.5-minute quadrangle topographic map; Figure 1).

Walden II Nature Preserve is located approximately 17 km north/northeast of the National Oceanic and Atmospheric Administration weather station at Chardon. The station at Chardon measured an average temperature of 9° Celsius, an average annual precipitation of 120 cm, and an average annual snowfall of 220 cm for 1988–1992.

The composition of the canopy and understory was evaluated for the 2500 m² of forest centered on the surveillance trap (point-quarter technique, nine points;

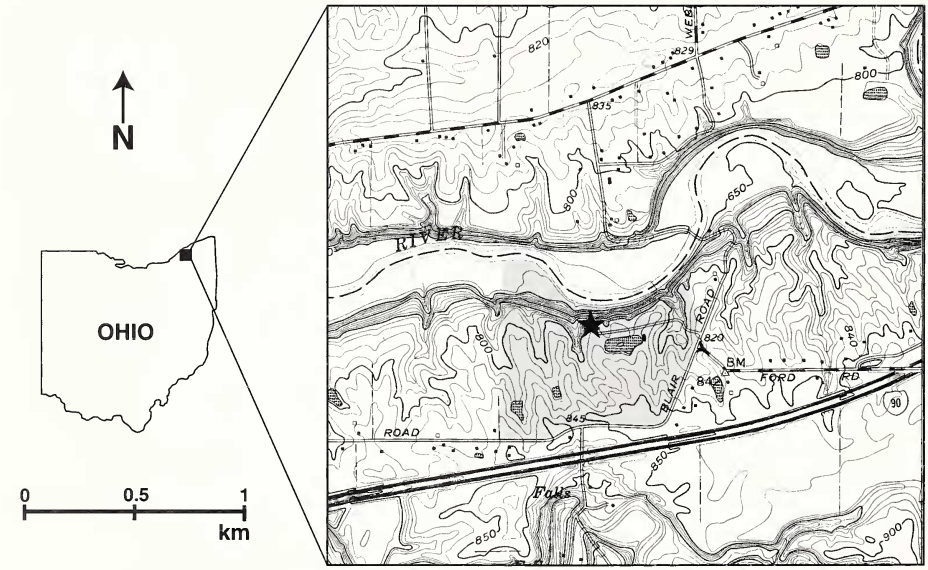

Figure 1. Map of the study area (adapted from the U.S. Geological Survey Painesville, Ohio, 7.5-minute quadrangle topographic map). Shaded area delineates Walden II Nature Preserve; star indicates position of surveillance trap within the Preserve.

Table 1. Importance values for woody plants at the surveillance site at Walden II Nature Preserve. The inventory included all woody stems with a circumference of five or more cm. A stem was counted as canopy only if it reached the uppermost layer of vegetation. Author citations according to Kartesz (1994); common names according to Weishaupt (1971).

Woody Plant Species		Canopy	Understory
Maple, sugar	*Acer saccharum* Marsh.	143	104
Hemlock, eastern	*Tsuga canadensis* (L.) Carr.	59	57
Beech, American	*Fagus grandifolia* Ehrh.	53	84
Tuliptree	*Liriodendron tulipifera* L.	20	8
Elm, American	*Ulmus americana* L.	16	0
Oak, northern red	*Quercus rubra* L.	8	13
Ash	*Fraxinus* spp.	0	9
Alder, speckled	*Alnus incana* ssp. *rugosa* (Du Roi) Clausen	0	9
Cherry, black	*Prunus serotina* Ehrh.	0	8
Grape, summer	*Vitis aestivalis* Michx.	0	8

Cottam and Curtis, 1956; Cox, 1980). The area used for the evaluation, 0.25 ha, is smaller than the area from which the moths are drawn. The light was visible to human eyes at distances of 80–90 m at Walden. The importance values for the woody plants at the surveillance site at Walden II Nature Preserve are given in Table 1.

The herbaceous plants included: ill-scented trillium *Trillium erectum* L.; common trillium *Trillium grandiflorum* (Michx.) Salisb.; big bluestem *Andropogon gerardii* Vitman var. *gerardii*; and bluejoint *Calamagrostis canadensis* (Michx.) Beauv. (James K. Bissell, 1998, personal communication; author citations according to Kartesz, 1994). The surveillance trap was within 1000 m of a pond and within 1000 m of the floodplain of the Grand River. The species were selected from a larger list of Walden species on deposit in the Herbarium at The Cleveland Museum of Natural History.

Surveillance Techniques

One Ellisco®-type ultraviolet light trap (15 watt, BL) was operated at the same location each year, from late May through September. The light was controlled by a timer from 7 p.m. to 8 a.m., eastern daylight time. The trap was set up before 7 p.m. the evening of operation and emptied after 8 a.m. the next morning. Two killing agents, potassium cyanide and ethyl acetate, were used during each collecting period. Using both improved the condition of the moths in the catch as compared to using only one or the other. Collections were made one week apart regardless of weather. The entire catches were sorted and archived in cellophane envelopes and all data were computerized. All the specimens collected are deposited in the Insect Collection at The Cleveland Museum of Natural History.

Results and Discussion

A total of 17,053 specimens representing 502 species were collected in 1988–1992 (Appendix). Species were identified using Covell (1984), Ferguson (1985), Forbes (1923; 1948; 1954; 1960), Holland (1922), Rings et al. (1992), and Rockburne and Lafontaine (1976). Nomenclature for the Noctuidae was updated from that used by Hodges et al. (1983) to that used by Rings et al. (1992; after Poole, 1989). Crambidae is used according to Scholtens (1996). There are 34 species that have been designated as plus-groups (+). These are species that are easily confused with closely related species; the count for a plus group may therefore include individuals from more than one species.

The accumulation of species collected over time, from 1987 to 1996, is shown in Figure 2. In 1987 (not included in this checklist), 351 species were collected, and in 1996, after ten years, the total had reached 592 (1993–1996, also not included in this checklist). Figure 2 illustrates the importance of long-term studies. One or two years of monitoring would not have been long enough to estimate moth biodiversity at Walden II Nature Preserve and five years would have been a minimum. The species accumulation curve was still rising after ten years of sampling. Rings and Metzler (1989) estimated that 600 to 1000 moth species may be sampled in a locality with high host plant diversity if collections are made at frequent intervals over five or more years. Our data are consistent with that assertion. It is expected that the asymptote of the curve is well above 600 species since a number of categories of moths are missing from our checklist: fall, winter, and early spring moths are missing because collecting was not begun until the end of May and collecting ended in September. Some species of moths are poorly sampled by light trapping. Also, many Microlepidoptera that were collected are not included because of the difficulty of identifying them.

Our checklist is a historical record of the moth species that were present in 1988–1992. The techniques were designed so that they can be duplicated in the future to document the changes in moth diversity that follow changes in land use and weather.

Relative abundances of the 502 species are shown in Figure 3. The Shannon-Wiener Diversity function was used to measure species diversity (Krebs, 1994). This index takes into account both the number of species and the manner in which the individuals are distributed among the species. A greater number of species increases the index and a more even distribution of individuals among the species also increases the index. Evenness can vary from zero to one and an evenness of one indicates that all species have the same number of individuals. The Shannon-Wiener Diversity Index is 7.1 and the Shannon-Wiener Evenness Index is 0.79.

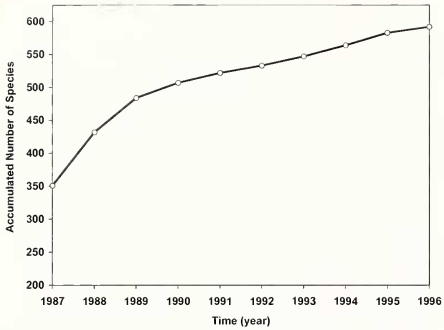

Figure 2. Plot of the annual accumulation of species collected at Walden II Nature Preserve, 1987–1996.

Almost six percent of the total count was composed of lesser maple spanworm moth *Itame pustularia* (6273) and sugar maple is the dominant canopy tree at this site. The next most abundant species was greater black-letter dart *Xestia dolosa* (10942.1+) whose larva feeds on apple, clover, maples, etc. Following, in order of decreasing abundance, were: banded tussock moth *Halysidota tessellaris* (8203+) whose larva feeds on many deciduous trees; rotund idia *Idia rotundalis* (8326) whose larva feeds on dead coral fungus and dead leaves; leafroller moth *Choristoneura fractivittana* (3632) whose larva feeds on apple, beeches, birches, etc.; sod webworm *Crambus agitatellus* (5362+) whose larva feeds on grasses and low plants; forest tent caterpillar moth *Malacosoma disstria* (7698) whose larva feeds on trees and shrubs, especially aspens and maples; yellow-collared scape moth *Cisseps fulvicollis* (8267) whose larva feeds on grasses, lichens, and spike-rushes; cynical quaker *Orthodes cynica* (10587) whose larva feeds on plantain, dandelion, and developing goldenrod blossoms; and oecophorid *Antaeotricha leucillana* (1014+) whose larva feeds on many deciduous trees.

Figure 3 also indicates, with a vertical line, every species that had been collected at single locations in Columbiana County (Rings and Metzler, 1992), Stark County (Rings et al., 1987), and Ashland County (Rings and Metzler, 1989). A total of 220 Walden II species have been collected at all four sites and can be considered to be widespread in northeast Ohio. Data on a wide variety of plants and animals show a broad positive correlation between abundance and distribution (Gaston, 1988; 1990). Three explanations have been proposed (Krebs, 1994). First, the relationship is an artifact of sampling because rarer species are less likely to be found. Second, species that use a restricted variety of resources are less likely to be abundant and widespread. And third, species that disperse more are more common and widespread. Our data (Figure 3) suggest that a positive correlation between abundance and distribution does not exist, when abundance is viewed from the perspective of abundance at Walden II. Of the 220 Walden II species which are widespread in northeast Ohio, 89 had total counts of 10 or fewer at Walden II.

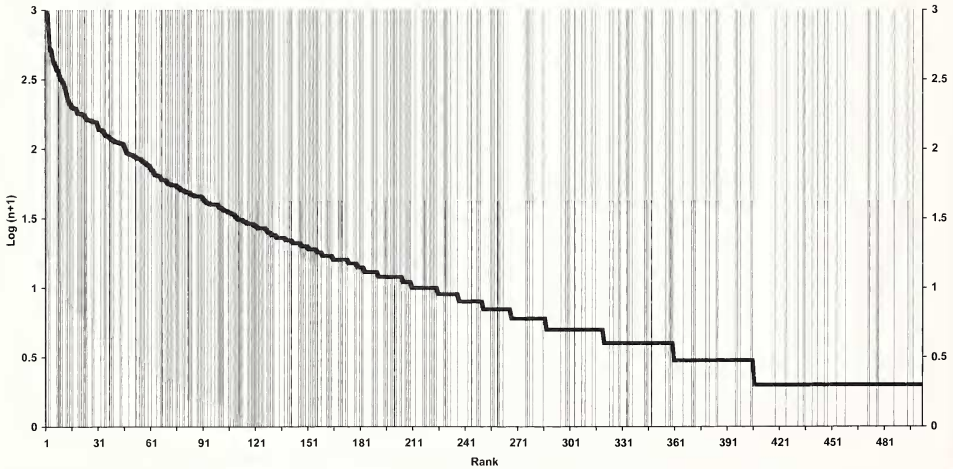

Figure 3. Plot of the logarithm of abundance versus rank. Vertical lines indicate species that are widespread in northeast Ohio. Species collected at Walden II Nature Preserve, 1988-1992.

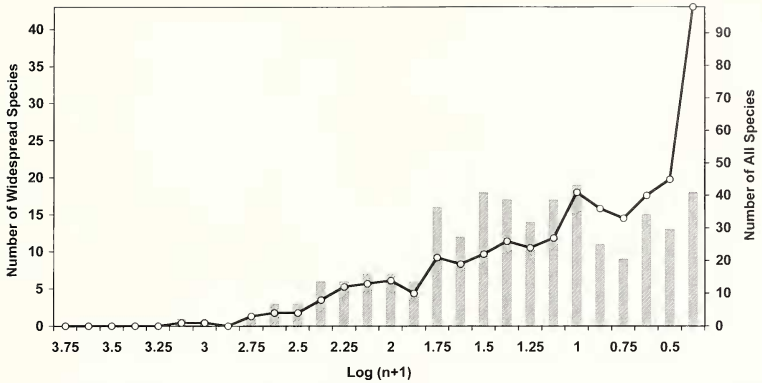

Figure 4. Correspondence between the total number of Walden II species in an abundance interval (line, scale at right) and the number of widespread Walden II species in the same abundance interval (bar, scale at left). Note that the y-axis scale for the widespread species is larger than the y-axis scale for the total number of species.

Overall, there is a close correspondence between the number of widespread species in an abundance interval and the total number of species (Figure 4). The exception is the decrease in the proportion of widespread species in the singleton interval. The 98 singleton species at Walden II include only 18 widespread species whereas the 45 doubleton species include 13 widespread species.

One species of owlet moth collected at Walden II is listed as being of special interest in Rings et al. (1992): scurfy quaker *Homorthodes furfurata* (10532) whose larva feeds on maples.

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Appendix. Checklist of species collected at Walden II Nature Preserve, 1988–92. Numbers preceding the species names are checklist numbers from Hodges et al. (1983). A plus-group (+) is a species that is easily confused with closely related species. Following the checklist number is the species name including author (abbreviations as listed in Hodges et al., 1983), date of collection, and count of specimens collected. When more than one collection date is listed, the first is the earliest seasonal date of collection and the second is the latest, both with the year in which that occurred. The count is the total number of specimens collected in 1988–1992.

Family TINEIDAE

372+ *Acrolophus plumifrontella* (Clem.)
June 22, 1988 . . . . . Count 2

Family OECOPHORIDAE

881 *Agonopterix senicionella* (Bsk.)
July 29, 1988 . . . . . Count 4

882 *Agonopterix robiniella* (Pack.)
July 22–Sep. 10, 1988 . . . . . Count 12

957 *Psilocorsis reflexella* Clem.
June 29, 1990–Aug. 30, 1991 . . . . . Count 48

1014+ *Antaeotricha leucillana* (Zell.)
May 28, 1992–Aug. 31, 1990. . . . . Count 311

1046 *Callima argenticinctella* Clem.
July 10, 1989–Aug. 24, 1990. . . . . Count 7

Family GELECHIIDAE

2295 *Trichotaphe flavocostella* Clem.
Aug. 16, 1990 . . . . . Count 1

Family YPONOMEUTIDAE

2401 *Atteva punctella* (Cram.)
June 8–Sep. 14, 1990 . . . . . Count 42

2420 *Yponomeuta multipunctella* Clem.
June 20, 1991–July 24, 1989 . . . . . Count 111

Family SESIIDAE

2554 *Synanthedon acerni* (Clem.)
June 19–July 31, 1989 . . . . . Count 4

Family TORTRICIDAE

3361 *Ancylis semiovana* (Zell.)
June 15–Aug. 19, 1988 . . . . . Count 75

3503 *Croesia semipurpurana* (Kft.)
June 15, 1988 . . . . . Count 1

3594 *Pandemis limitata* (Rob.)
May 30, 1991–Sep. 14, 1990 . . . . . Count 173

3623 *Argyrotaenia quercifoliana* (Fitch)
June 15, 1988–July 3, 1992 . . . . . Count 9

3624 *Argyrotaenia alisellana* (Rob.)
June 6, 1991–June 26, 1992 . . . . . Count 3

3625 *Argyrotaenia mariana* (Fern.)
June 4, 1989 . . . . . Count 1

3632 *Choristoneura fractivittana* (Clem.)
May 30, 1991–Sep. 10, 1988 . . . . . Count 425

3633 *Choristoneura parallela* (Rob.)
May 30, 1991–Sep. 4, 1992 . . . . . Count 84

3635 *Choristoneura rosaceana* (Harr.)
May 30, 1991–Sep. 14, 1990. . . . . Count 155

3648 *Archips argyrospila* (Wlk.)
July 10, 1989 . . . . . Count 3

3658 *Archips purpurana* (Clem.)
July 10, 1989 . . . . . Count 2

3672 *Syndemis afflictana* (Wlk.)
May 18, 1988 . . . . . Count 5

3686 *Clepsis melaleucana* (Wlk.)
May 30, 1991–June 26, 1992 . . . . . Count 161

3720 *Sparganothis reticulatana* (Clem.)
July 10, 1989–Sep. 10, 1988 . . . . . Count 15

3725 *Sparganothis pettitana* (Rob.)
July 3–July 10, 1992 . . . . . Count 4

3748 *Amorbia humerosana* Clem.
May 30, 1991–June 26, 1989 . . . . . Count 20

Family ZYGAENIDAE

4624 *Harrisina americana* (Guer.)
June 22, 1990–July 17, 1992. . . . . Count 3

Family LIMACODIDAE

4652 *Tortricidia testacea* Pack.
May 30, 1991–July 4, 1989 . . . . . Count 52

4654 *Tortricidia flexuosa* (Grt.)
May 30, 1991–Aug. 3, 1990 . . . . . Count 136

4659 *Packardia geminata* (Pack.)
May 30, 1991–July 10, 1992. . . . . Count 19

4661 *Packardia elegans* (Pack.)
June 20, 1991–July 10, 1992 . . . . . Count 2

4665 *Lithacodes fasciola* (H.-S.)
May 30–Aug. 30, 1991 . . . . . Count 45

4667 *Apoda y-inversum* (Pack.)
June 20, 1991–July 17, 1992 . . . . . Count 9

4669 *Apoda biguttata* (Pack.)
June 6, 1991–July 22, 1988 . . . . . Count 7

4671 *Prolimacodes badia* (Hbn.)
June 26, 1989–Aug. 5, 1988 . . . . . Count 9

4681 *Isa textula* (H.-S.)
July 5, 1991–Aug. 5, 1988 . . . . . Count 12

4685 *Adoneta spinuloides* (H.-S.)
June 27, 1991–July 29, 1988 . . . . . Count 9

4697 *Euclea delphinii* (Bdv.)
May 30–Aug. 23, 1991 . . . . . Count 34

4700 *Sibine stimulea* (Clem.)
July 22, 1988 . . . . . Count 1

Family CRAMBIDAE

4703 *Gesneria centuriella* (D. & S.)
June 12–Aug. 21, 1989 . . . . . Count 194

4748 *Munroessa icciusalis* (Wlk.)
Aug. 23, 1991 . . . . . Count 1

4751 *Munroessa gyralis* (Hulst)
June 20, 1991–Sep. 9, 1989 . . . . . Count 2

4761 *Parapoynx badiusalis* (Wlk.)
Aug. 14, 1989 . . . . . Count 1
4774 *Petrophila bifascialis* (Rob.)
Sep. 9, 1989 . . . . . Count 1
4889 *Dicymolomia julianalis* (Wlk.)
June 22, 1988–Sep. 7, 1990 . . . . . Count 4
4897 *Evergestis pallidata* (Hufn.)
June 15, 1988–Sep. 7, 1990 . . . . . Count 5
4936 *Sancrobotys futilalis* (Led.)
June 5–July 3, 1992 . . . . . Count 5
4937 *Nascia acutella* (Wlk.)
May 30–Aug. 2, 1991 . . . . . Count 8
4944 *Crocidophora serratissimalis* Zell.
June 20, 1991–Sep. 2, 1989 . . . . . Count 8
4945 *Crocidophora tuberculalis* Led.
May 30, 1991–July 24, 1989 . . . . . Count 11
4949 *Ostrinia nubilalis* (Hbn.)
May 30–Aug. 30, 1991 . . . . . Count 55
4953a *Phlyctaenia coronata tertialis* (Gn.)
May 30–Aug. 30, 1991 . . . . . Count 13
4962 *Hahncappsia marculenta* (G. & R.)
June 15, 1988–Sep. 9, 1989 . . . . . Count 9
4980 *Helvibotys helvialis* (Wlk.)
July 8, 1988 . . . . . Count 8
4991 *Sericoplaga externalis* Warr.
Aug. 14, 1989 . . . . . Count 1
5040 *Pyrausta bicoloralis* (Gn.)
May 30, 1991–Sep. 9, 1989 . . . . . Count 14
5071 *Pyrausta acrionalis* (Wlk.)
June 20, 1991–Sep. 7, 1990 . . . . . Count 4
5079 *Udea rubigalis* (Gn.)
May 30, 1991–Sep. 14, 1990 . . . . . Count 90
5142 *Diacme elealis* (Wlk.)
June 29–July 27, 1990 . . . . . Count 15
5156 *Nomophila nearctica* Mun.
July 12–Aug. 16, 1991 . . . . . Count 2
5159 *Desmia funeralis* (Hbn.)
May 30, 1991–Sep. 10, 1988 . . . . . Count 179
5182 *Blepharomastix ranalis* (Gn.)
June 22–July 27, 1990 . . . . . Count 39
5226 *Palpita magniferalis* (Wlk.)
May 30–Aug. 23, 1991 . . . . . Count 100
5228 *Polygrammodes flavidalis* (Gn.)
July 4, 1989–Aug. 24, 1990 . . . . . Count 2
5241 *Pantographa limata* (G. & R.)
June 27, 1991–Sep. 4, 1992 . . . . . Count 84
5272 *Herpetogramma bipunctalis* (F.)
June 12–Sep. 9, 1989 . . . . . Count 29
5275 *Herpetogramma pertextalis* (Led.)
June 12–Aug. 21, 1989 . . . . . Count 39
5277 *Herpetogramma thestealis* (Wlk.)
July 3, 1992 . . . . . Count 11
5280 *Herpetogramma aeglealis* (Wlk.)
July 10, 1992–Aug. 2, 1991 . . . . . Count 20
5362+ *Crambus agitatellus* Clem.
June 5, 1992–Sep. 2, 1989 . . . . . Count 407
5392 *Arequipa turbatella* Wlk.
July 17, 1992 . . . . . Count 1
5403 *Agriphila vulgivagella* (Clem.)
Sep. 10, 1992 . . . . . Count 1
5464 *Urola nivalis* (Drury)
July 10, 1989–July 15, 1988 . . . . . Count 4

Family PYRALIDAE

5518 *Aglossa cuprina* Zell.
June 6, 1991–Aug. 27, 1992 . . . . . Count 88
5524 *Hypsopygia costalis* (F.)
June 15, 1988–Sep. 9, 1989 . . . . . Count 176
5532 *Herculia infimbrialis* Dyar
July 8, 1988–Aug. 21, 1989 . . . . . Count 12
5533 *Herculia olinalis* (Gn.)
July 13, 1990–Aug. 5, 1988 . . . . . Count 3
5552 *Galasa nigrinodis* (Zell.)
July 5, 1991 . . . . . Count 1
5556 *Tosale oviplagalis* (Wlk.)
June 26, 1989–Aug. 7, 1992 . . . . . Count 50
5571 *Condylolomia participalis* Grt.
June 20, 1991–Aug. 14, 1989 . . . . . Count 155
5577 *Epipaschia superatalis* Clem.
June 22, 1988–July 27, 1990 . . . . . Count 7
5606 *Tetralopha asperatella* (Clem.)
June 29, 1990 . . . . . Count 1
5997 *Euzophera ostricolorella* Hulst
June 15, 1988–July 20, 1990 . . . . . Count 9
6053 *Peoria approximella* (Wlk.)
June 22, 1990–July 24, 1989 . . . . . Count 3

Family THYRIDIDAE

6079 *Dysodia granulata* (Neum.)
July 17–Sep. 9, 1989 . . . . . Count 5

Family THYATIRIDAE

6237 *Pseudothyatira cymatophoroides* (Gn.)
Aug. 14, 1989 . . . . . Count 1

Family DREPANIDAE

6251 *Drepana arcuata* Wlk.
June 5, 1992–Aug. 24, 1990 . . . . . Count 10
6255 *Oreta rosea* (Wlk.)
May 30, 1991–Sep. 24, 1988 . . . . . Count 3

Family GEOMETRIDAE

6261 *Heliomata cycladata* G. & R.
May 30, 1991–July 3, 1992 . . . . . Count 37
6270 *Protitane virginalis* (Hulst)
June 26, 1989–Aug. 24, 1990 . . . . . Count 7
6273 *Itame pustularia* (Gn.)
June 20, 1991–Sep. 4, 1992 . . . . . Count 1004
6299 *Itame coortaria* (Hulst)
June 20, 1991–July 10, 1989 . . . . . Count 3
6303 *Itame subcessaria* (Wlk.)
July 17, 1992–July 24, 1989 . . . . . Count 2
6335+ *Semiothisa aequiferaria* (Wlk.)
June 1, 1990–Sep. 9, 1989 . . . . . Count 40
6340 *Semiothisa minorata* (Pack.)
July 12, 1991–Aug. 16, 1990 . . . . . Count 4
6342 *Semiothisa bisignata* (Wlk.)
June 22, 1988–Aug. 16, 1991 . . . . . Count 3

6344+ *Semiothisa signaria* (Hbn.)
May 30–Sep. 13, 1991 . . . . . Count 198

6360 *Semiothisa quadrinotaria* (H.-S.)
June 12, 1992–July 31, 1989 . . . . . Count 5

6386 *Semiothisa ocellinata* (Gn.)
June 15, 1988–Sep. 9, 1989 . . . . . Count 78

6405 *Semiothisa gnophosaria* (Gn.)
July 5, 1991–Aug. 24, 1990 . . . . . Count 4

6486 *Turnos scolopacinarius* (Gn.)
June 15, 1988 . . . . . Count 1

6583 *Anacamptodes ephyraria* (Wlk)
June 20, 1991–Aug. 14, 1989 . . . . . Count 16

6584 *Anacamptodes humaria* (Gn.)
June 27–July 12, 1991 . . . . . Count 2

6586 *Anacamptodes defectaria* (Gn.)
July 13, 1990 . . . . . Count 1

6588 *Iridopsis larvaria* (Gn.)
May 30, 1991–Sep. 7, 1990 . . . . . Count 31

6590 *Anavitrinella pampinaria* (Gn.)
May 28, 1989–Sep. 10, 1988 . . . . . Count 17

6597 *Ectropis crepuscularia* (D. & S.)
June 20–Sep. 13, 1991 . . . . . Count 48

6598 *Protoboarmia porcelaria* (Gn.)
July 24, 1989–Aug. 5, 1988 . . . . . Count 2

6599 *Epimecis hortaria* (F.)
May 21–Aug. 14, 1989 . . . . . Count 44

6620+ *Melanolophia canadaria* (Gn.)
May 21, 1989–Sep. 6, 1991 . . . . . Count 50

6638 *Eufidonia notataria* (Wlk.)
June 1, 1990–June 15, 1988 . . . . . Count 32

6640a *Biston betularia cognataria* (Gn.)
June 8, 1988–July 24, 1989 . . . . . Count 3

6654 *Hypagyrtis unipunctata* (Haw.)
June 15, 1988–Sep. 2, 1989 . . . . . Count 8

6655 *Hypagyrtis esther* (Barnes)
May 30, 1991–Sep. 7, 1990 . . . . . Count 108

6667 *Lomographa vestaliata* (Gn.)
May 30, 1991–July 10, 1992 . . . . . Count 30

6677 *Cabera erythemaria* Gn.
June 4, 1989–Aug. 21, 1992 . . . . . Count 17

6678 *Cabera variolaria* Gn.
June 8, 1990–Aug. 14, 1989 . . . . . Count 2

6680 *Cabera quadrifasciaria* (Pack.)
June 22, 1988 . . . . . Count 1

6720 *Lytrosis unitaria* (H.-S.)
June 20, 1991–July 10, 1992 . . . . . Count 22

6724 *Euchlaena serrata* (Drury)
July 8, 1988 . . . . . Count 1

6725 *Euchlaena muzaria* (Wlk.)
June 15, 1988–July 10, 1992 . . . . . Count 6

6729 *Euchlaena johnsonaria* (Fitch)
June 12, 1989–Aug. 24, 1990 . . . . . Count 3

6739 *Euchlaena irraria* (B. & McD.)
June 26, 1992 . . . . . Count 1

6740+ *Xanthotype urticaria* Swett
May 30, 1991–Aug. 14, 1989 . . . . . Count 4

6753+ *Pero honestaria* (Wlk.)
May 21, 1989–Aug. 27, 1992 . . . . . Count 117

6763 *Nacophora quernaria* (J.E. Smith)
June 8, 1988 . . . . . Count 1

6796 *Campaea perlata* (Gn.)
May 30, 1991–Sep. 21, 1990 . . . . . Count 110

6797 *Enmomos magnaria* Gn.
July 31, 1989–Aug. 24, 1990 . . . . . Count 2

6798 *Enmomos subsignaria* (Hbn.)
June 20, 1991–Sep. 4, 1992 . . . . . Count 294

6819 *Metanema inatomaria* Gn.
June 15–Aug. 3, 1990 . . . . . Count 6

6823 *Metarranthis angularia* B. & McD.
July 4, 1989 . . . . . Count 1

6825 *Metarranthis indeclinata* (Wlk.)
May 30, 1991–June 5, 1992 . . . . . Count 4

6826 *Metarranthis hypocharia* (H.-S.)
May 30, 1991–July 3, 1992 . . . . . Count 22

6835 *Cepphis armataria* (H.-S.)
June 20, 1991–July 13, 1990 . . . . . Count 5

6836 *Anagoga occidnaria* (Wlk.)
July 29, 1988–Aug. 14, 1989 . . . . . Count 18

6838+ *Probole amicaria* (H.-S.)
May 30, 1991–July 17, 1992 . . . . . Count 54

6840 *Plagodis serinaria* H.-S.
May 28, 1989–July 3, 1992 . . . . . Count 159

6841 *Plagodis kuetzingi* (Grt.)
June 15, 1988 . . . . . Count 2

6842 *Plagodis phlogosaria* (Gn.)
July 10, 1989–July 27, 1990 . . . . . Count 4

6844 *Plagodis alcoolaria* (Gn.)
June 1, 1990–July 31, 1989 . . . . . Count 30

6863 *Caripeta divisata* Wlk.
July 24, 1989–Aug. 19, 1988 . . . . . Count 7

6884 *Besma endropiaria* (G. & R.)
May 30, 1991–July 15, 1988 . . . . . Count 64

6885 *Besma quercivoraria* (Gn.)
June 19, 1989–Aug. 27, 1992 . . . . . Count 10

6888 *Lambdina fiscellaria* (Gn.)
Sep. 21, 1990– Sep. 25, 1992 . . . . . Count 5

6906 *Nepytia canosaria* (Wlk.)
Sep. 24, 1988 . . . . . Count 5

6912 *Sicya macularia* (Harr.)
June 20, 1991–July 8, 1988 . . . . . Count 11

6941 *Eusarca confusaria* Hbn.
July 4–Sep. 2, 1989 . . . . . Count 11

6963 *Tetracis crocallata* Gn.
June 6, 1991–July 17, 1992 . . . . . Count 4

6964 *Tetracis cachexiata* Gn.
May 30, 1991–June 26, 1992 . . . . . Count 87

6965 *Engonobapta nivosaria* (Gn.)
June 20, 1991–Sep. 9, 1989 . . . . . Count 35

6966 *Eutrapela clemataria* (J.E. Smith)
May 21, 1989–Aug. 23, 1991 . . . . . Count 46

6982 *Prochoerodes transversata* (Drury)
June 20, 1991–Sep. 24, 1988 . . . . . Count 55

6987 *Antepione thisoaria* (Gn.)
July 12, 1991–Aug. 5, 1988 . . . . . Count 7

6989 *Antepione indiscretata* (Hy. Edw.)
July 15, 1988 . . . . . Count 1

7009 *Nematocampa limbata* (Haw.)
June 26, 1989–July 31, 1992 . . . . . Count 15

7046+ *Nemoria bistriaria* Hbn.
July 15, 1988–Aug. 27, 1992 . . . . . Count 15

7048 *Nemoria mimosaria* (Gn.)
May 30, 1991–June 5, 1992 . . . . . Count 3

7053 *Dichorda iridaria* (Gn.)
July 12, 1991–Aug. 5, 1988 . . . . . Count 2

7058 *Synchlora aerata* (F.)
May 30–Aug. 30, 1991 . . . . . Count 2

7071 *Chlorochlamys chloroleucaria* (Gn.)
Aug. 30, 1991 . . . . . Count 1

7132 *Pleuroprucha insulsaria* (Gn.)
May 30, 1991–Sep. 21, 1990 . . . . . Count 63

7139 *Cyclophora pendulinaria* (Gn.)
Aug. 2, 1991 . . . . . Count 1

7146 *Haematopis grataria* (F.)
Aug. 14–Sep. 9, 1989 . . . . . Count 3

7159 *Scopula limboundata* (Haw.)
June 19, 1989–Sep. 10, 1988 . . . . . Count 59

7169 *Scopula inductata* (Gn.)
July 20, 1990 . . . . . Count 1

7189 *Dysstroma hersiliata* (Gn.)
June 27, 1991–July 3, 1992 . . . . . Count 2

7196+ *Eulithis diversilineata* (Hbn.)
July 5, 1991–Sep. 25, 1992 . . . . . Count 27

7206 *Eulithis explanata* (Wlk.)
July 27, 1990 . . . . . Count 1

7290 *Coryphista meadii* (Pack.)
July 19, 1991 . . . . . Count 2

7307 *Mesoleuca ruficillata* (Gn.)
June 15, 1988 . . . . . Count 1

7330 *Anticlea multiferata* (Wlk.)
June 12, 1992 . . . . . Count 1

7368 *Xanthorhoe labradorensis* (Pack.)
May 18–Sep. 24, 1988 . . . . . Count 16

7371 *Xanthorhoe iduata* (Gn.)
June 12, 1989 . . . . . Count 1

7388 *Xanthorhoe ferrugata* (Cl.)
May 30, 1991–June 12, 1989 . . . . . Count 3

7390 *Xanthorhoe lacustrata* (Gn.)
May 30, 1991–Sep. 9, 1989 . . . . . Count 34

7394 *Epirrhoe alternata* (Muller)
June 19–Aug. 21, 1989 . . . . . Count 2

7399a *Euphyia unangulata intermediata* (Gn.)
May 30, 1991–Sep. 10, 1988 . . . . . Count 8

7414 *Orthonama obstipata* (F.)
May 28–Sep. 9, 1989 . . . . . Count 22

7416 *Orthonama centrostrigaria* (Woll.)
May 30, 1991–Sep. 9, 1989 . . . . . Count 92

7422 *Hydrelia inornata* (Hulst)
May 30, 1991–Aug. 16, 1990 . . . . . Count 7

7430 *Trichodezia albovittata* (Gn.)
July 19, 1991–Aug. 27, 1992 . . . . . Count 3

7440 *Eubaphe mendica* (Wlk.)
June 22, 1990 . . . . . Count 1

7445 *Horisme intestinata* (Gn.)
June 22, 1988–Sep. 9, 1989 . . . . . Count 6

7474+ *Eupithecia miserulata* Grt.
May 28–Sep. 25, 1992 . . . . . Count 196

7647 *Heterophleps triguttaria* H.-S.
July 8, 1988 . . . . . Count 1

7648 *Dyspteris abortivaria* (H.-S.)
May 30, 1991–Aug. 14, 1989 . . . . . Count 12

Family MIMALLONIDAE

7659 *Lacosoma chiridota* Grt.
June 15, 1988 . . . . . Count 1

7662 *Cicinnus melsheimeri* (Harr.)
June 15–June 29, 1988 . . . . . Count 2

Family APATELODIDAE

7663 *Apatelodes torrefacta* (J.E. Smith)
June 20, 1991–June 29, 1990 . . . . . Count 3

7665 *Olceclostera angelica* (Grt.)
July 4, 1989–July 22, 1988 . . . . . Count 5

Family LASIOCAMPIDAE

7670 *Tolype velleda* (Stoll)
July 27, 1990–Sep. 25, 1992 . . . . . Count 24

7673 *Tolype laricis* (Fitch)
July 5, 1991–Sep. 10, 1988 . . . . . Count 54

7675 *Tolype minta* Dyar
July 29, 1988 . . . . . Count 1

7698 *Malacosoma disstria* Hbn.
June 20, 1991–July 31, 1989 . . . . . Count 371

7701 *Malacosoma americanum* (F.)
June 15, 1988–July 17, 1989 . . . . . Count 84

Family SATURNIIDAE

7715 *Dryocampa rubicunda* (F.)
May 30, 1991–July 24, 1989 . . . . . Count 45

7723 *Anisota virginiensis* (Drury)
May 30, 1991 . . . . . Count 1

7746 *Automeris io* (F.)
June 4–July 4, 1989 . . . . . Count 7

7758 *Actias luna* (L.)
June 15, 1990–July 8, 1988 . . . . . Count 2

7765 *Callosamia angulifera* (Wlk.)
June 15, 1988–July 27, 1990 . . . . . Count 7

Family SPHINGIDAE

7787 *Ceratomia undulosa* (Wlk.)
May 28, 1992 . . . . . Count 1

7824 *Paonias excaecatus* (J.E. Smith)
June 13, 1991–July 31, 1989 . . . . . Count 5

7825 *Paonias myops* (J.E. Smith)
May 28, 1992–Aug. 16, 1990 . . . . . Count 9

7827 *Laothoe juglandis* (J.E. Smith)
May 30, 1991–July 17, 1989 . . . . . Count 6

7828 *Pachysphinx modesta* (Harr.)
June 4, 1989 . . . . . Count 1

7870 *Sphecodina abbottii* (Swainson)
June 15, 1988 . . . . . Count 1

7871 *Deidamia inscripta* (Harr.)
May 14–June 19, 1989 . . . . . Count 12

7885 *Darapsa myron* (Cram.)
June 19, 1989–July 29, 1988 . . . . . Count 4

Family NOTODONTIDAE

7895 *Clostera albosigma* Fitch
June 6, 1991–Aug. 7, 1992 . . . . . Count 4

7898 *Clostera strigosa* (Grt.)
July 12, 1991–July 29, 1988 . . . . . Count 3

7901 *Clostera apicalis* (Wlk.)
May 21, 1989–Aug. 9, 1990 . . . . . Count 9

7902 *Datana ministra* (Drury)
June 22, 1990 . . . . . Count 1

7906+ *Datana contracta* Wlk.
June 27, 1991–July 27, 1990 . . . . . Count 9

7915 *Nadata gibbosa* (J.E. Smith)
May 30, 1991–Aug. 21, 1992 . . . . . Count 76

7917 *Hyperaeschra georgica* (H.-S.)
June 4–June 19, 1989 . . . . . Count 5

7919 *Peridea basitriens* (Wlk.)
May 30, 1991–Aug. 21, 1989 . . . . . Count 179

7920 *Peridea angulosa* (J.E. Smith)
May 30, 1991–Aug. 26, 1988 . . . . . Count 26

7921 *Peridea ferruginea* (Pack.)
July 10, 1989 . . . . . Count 1

7922 *Pheosia rimosa* Pack.
June 29, 1988–Aug. 3, 1990 . . . . . Count 3

7924 *Odontosia elegans* (Stkr.)
June 26, 1989–Aug. 19, 1988 . . . . . Count 2

7929 *Nerice bidentata* Wlk.
June 19, 1989–Aug. 26, 1988 . . . . . Count 10

7930 *Ellida caniplaga* (Wlk.)
June 1, 1990–July 24, 1989 . . . . . Count 23

7931 *Gluphisia septentrionis* Wlk.
June 15, 1988–Aug. 9, 1990 . . . . . Count 8

7936 *Furcula borealis* (Guer.-Meneville)
July 22, 1988–Aug. 9, 1990 . . . . . Count 6

7939 *Furcula occidentalis* (Lint.)
July 17, 1989 . . . . . Count 1

7951+ *Symmerista albifrons* (J.E. Smith)
May 30, 1991–Aug. 21, 1992 . . . . . Count 63

7957 *Dasylophia anguina* (J.E. Smith)
Aug. 16, 1990 . . . . . Count 1

7958 *Dasylophia thyatiroides* (Wlk.)
June 15, 1988–July 31, 1989 . . . . . Count 2

7974 *Misogada unicolor* (Pack.)
May 30, 1991–July 24, 1989 . . . . . Count 4

7975 *Macrurocampa marthesia* (Cram.)
July 4, 1989–Aug. 9, 1990 . . . . . Count 26

7994 *Heterocampa guttivitta* (Wlk.)
May 30, 1991–Aug. 9, 1990 . . . . . Count 156

7995 *Heterocampa biundata* Wlk.
July 26, 1991–Aug. 21, 1989 . . . . . Count 5

7998 *Lochmaeus manteo* Doubleday
July 22, 1988 . . . . . Count 1

7999 *Lochmaeus bilineata* (Pack.)
June 1–Aug. 16, 1990 . . . . . Count 24

8005 *Schizura ipomoeae* Doubleday
June 22–Aug. 5, 1988 . . . . . Count 6

8006 *Schizura badia* (Pack.)
July 3, 1992–Aug. 9, 1990 . . . . . Count 4

8007 *Schizura unicornis* (J.E. Smith)
May 30, 1991–Aug. 16, 1990 . . . . . Count 23

8011 *Schizura leptinoides* (Grt.)
May 30, 1991–Aug. 19, 1988 . . . . . Count 15

8012 *Oligocentria semirufescens* (Wlk.)
June 15, 1988 . . . . . Count 2

8017 *Oligocentria lignicolor* (Wlk.)
June 15, 1988–Aug. 7, 1992 . . . . . Count 5

Family ARCTIIDAE

8045.1 *Cranbidia pallida* Pack.
July 13, 1990 . . . . . Count 1

8107 *Haploa clymene* (Brown)
July 12, 1991–July 31, 1989 . . . . . Count 14

8121+ *Holomelina aurantiaca* (Hbn.)
June 20, 1991–Aug. 16, 1990 . . . . . Count 111

8129 *Pyrrharctia isabella* (J.E. Smith)
June 6, 1991–Sep. 10, 1992 . . . . . Count 48

8133 *Spilosoma latipennis* Stretch
May 30, 1991–July 6, 1990 . . . . . Count 33

8134 *Spilosoma congrua* Wlk.
May 21, 1989–July 17, 1992 . . . . . Count 178

8137 *Spilosoma virginica* (F.)
June 12, 1989–Aug. 19, 1988 . . . . . Count 26

8140 *Hyphantria cunea* (Drury)
May 30, 1991–Aug. 16, 1990 . . . . . Count 15

8156 *Phragmatobia fuliginosa* (L.)
July 15–Aug. 5, 1988 . . . . . Count 3

8169+ *Apantesis phalerata* (Harr.)
June 19, 1989–Aug. 27, 1992 . . . . . Count 11

8197 *Apantesis virgo* (L.)
July 31, 1989 . . . . . Count 1

8203+ *Halysidota tessellaris* (J.E. Smith)
May 30–Sep. 13, 1991 . . . . . Count 525

8211 *Lophocampa caryae* Harr.
May 30, 1991–June 15, 1988 . . . . . Count 11

8230 *Cycnia tenera* Hbn.
June 22, 1988–Aug. 3, 1990 . . . . . Count 6

8231 *Cycnia oregonensis* (Stretch)
June 5, 1992–July 29, 1988 . . . . . Count 9

8238 *Euchaetes egle* (Drury)
June 20, 1991–July 24, 1989 . . . . . Count 7

8262 *Ctenucha virginica* (Esp.)
June 20, 1991–June 22, 1988 . . . . . Count 2

8267 *Cisseps fulvicollis* (Hbn.)
May 28, 1992–Sep. 21, 1990 . . . . . Count 363

Family LYMANTRIIDAE

8304 *Dasychira plagiata* (Wlk.)
July 17, 1992–July 24, 1989 . . . . . Count 2

8314 *Orgyia definita* Pack.
Sep. 6, 1991–Sep. 24, 1988 . . . . . Count 8

8316 *Orgyia leucostigma* (J.E. Smith)
Aug. 30, 1991–Sep. 21, 1990 . . . . . Count 3

8318 *Lymantria dispar* (L.)
June 27, 1991–Aug. 27, 1992 . . . . . Count 123

Family NOCTUIDAE

8322 *Idia americalis* (Gn.)
June 15, 1988–Sep. 25, 1992 . . . . . Count 54

8323+ *Idia aemula* Hbn.
May 30, 1991–Sep. 25, 1992 . . . . . Count 217

8326 *Idia rotundalis* (Wlk.)
July 5, 1991–Aug. 31, 1990 . . . . . Count 507

8327 *Idia forbesi* (French)
July 10, 1989–Aug. 27, 1992 . . . . . Count 137

8328 *Idia julia* (B. & McD.)
July 17, 1989 . . . . . Count 1

8329 *Idia diminuendis* (B. & McD.)
July 5, 1991–Aug. 21, 1989 . . . . . Count 113

8330 *Idia scobialis* (Grt.)
July 13, 1990–July 17, 1989 . . . . . Count 5

8334 *Idia lubricalis* (Gey.)
June 26, 1989–Aug. 23, 1991 . . . . . Count 18

8338 *Phalaenophana pyrrausalis* (Wlk.)
June 5–Aug. 21, 1992 . . . . . Count 4

8340 *Zanclognatha litoralis* (Hbn.)
June 5, 1992–Aug. 5, 1988 . . . . . Count 41

8345 *Zanclognatha laevigata* (Grt.)
July 4, 1989–Aug. 27, 1992 . . . . . Count 59

8348 *Zanclognatha pedipilalis* (Gn.)
June 15, 1990–Aug. 21, 1989 . . . . . Count 4

8351 *Zanclognatha cruralis* (Gn.)
June 19, 1989–July 8, 1988 . . . . . Count 6

8352+ *Zanclognatha jacchusalis* (Wlk.)
June 29, 1990–Sep. 25, 1992 . . . . . Count 161

8355 *Chytolita morbidalis* (Gn.)
May 30, 1991–July 8, 1988 . . . . . Count 39

8356 *Chytolita petrealis* Grt.
July 3, 1992 . . . . . Count 1

8358 *Macrochilo litophora* (Grt.)
July 5, 1991–July 24, 1989 . . . . . Count 4

8362 *Phalaenostola metonalis* (Wlk.)
June 12, 1992–July 8, 1988 . . . . . Count 4

8363 *Phalaenostola eumelusalis* (Wlk.)
July 31, 1989 . . . . . Count 1

8368 *Tetanolita floridana* (Sm.)
July 10, 1992 . . . . . Count 1

8370 *Bleptina caradrinalis* Gn.
June 22, 1988–Sep. 9, 1989 . . . . . Count 39

8378 *Renia salusalis* (Wlk.)
June 22–Aug. 19, 1988 . . . . . Count 22

8379 *Renia factiosalis* (Wlk.)
July 17, 1989–Aug 26, 1988 . . . . . Count 93

8381 *Renia discoloralis* Gn.
July 12, 1991–Sep. 10, 1988 . . . . . Count 90

8384.1 *Renia flavipunctalis* (Gey.)
July 24, 1989 . . . . . Count 3

8386 *Renia adspergillus* (Bosc)
June 29–Sep. 7, 1990 . . . . . Count 14

8387 *Renia sobrialis* (Wlk.)
July 24, 1989–July 27, 1990 . . . . . Count 3

8393 *Lascoria ambigualis* Wlk.
Aug. 14, 1989 . . . . . Count 1

8397 *Palthis angulalis* (Hbn.)
May 30, 1991–Sep. 14, 1990 . . . . . Count 39

8398 *Palthis asopialis* (Gn.)
June 6, 1991–Sep. 25, 1992 . . . . . Count 33

8401 *Redectis vitrea* (Grt.)
July 17, 1992 . . . . . Count 1

8404 *Rivula propinqualis* Gn.
May 30, 1991–Sep. 14, 1990 . . . . . Count 21

8421 *Hypenodes fractilinea* (Sm.)
Aug. 27, 1992 . . . . . Count 1

8427 *Dyspyralis puncticosta* (Sm.)
July 19, 1991 . . . . . Count 1

8428 *Dyspyralis nigella* (Stkr.)
June 27, 1991–July 31, 1989 . . . . . Count 3

8441 *Bomolocha manalis* (Wlk.)
June 15, 1990–Sep. 6, 1991 . . . . . Count 11

8442 *Bomolocha baltimoralis* (Gn.)
May 30, 1991–Sep. 14, 1990 . . . . . Count 131

8444 *Bomolocha palparia* (Wlk.)
July 8–July 29, 1988 . . . . . Count 3

8445 *Bomolocha abalienalis* (Wlk.)
May 30–Aug. 30, 1991 . . . . . Count 2

8446 *Bomolocha deceptalis* (Wlk.)
June 26–Sep. 9, 1989 . . . . . Count 11

8447 *Bomolocha madefactalis* (Gn.)
June 12–Aug. 21, 1989 . . . . . Count 9

8465 *Plathypena scabra* (F.)
May 30, 1991–Sep. 25, 1992 . . . . . Count 37

8479 *Spargaloma sexpunctata* Grt.
June 12, 1992–Aug. 24, 1990 . . . . . Count 8

8491 *Ledaea perditalis* (Wlk.)
Aug. 21, 1989 . . . . . Count 1

8499 *Metalectra discalis* (Grt.)
July 5, 1991–Aug. 21, 1989 . . . . . Count 4

8514 *Scolecocampa liburna* (Gey.)
July 5, 1991–Aug. 14, 1989 . . . . . Count 15

8536 *Calyptra canadensis* (Bethune)
June 15, 1988–July 4, 1989 . . . . . Count 4

8555 *Scoliopteryx libatrix* (L.)
June 13, 1991 . . . . . Count 1

8587 *Panopoda rufimargo* (Hbn.)
May 30–Aug. 30, 1991 . . . . . Count 57

8588 *Panopoda carneicosta* Gn.
July 12–July 19, 1991 . . . . . Count 3

8641 *Drasteria grandirena* (Haw.)
July 10, 1989 . . . . . Count 1

8689 *Zale lunata* (Drury)
June 29, 1988–July 19, 1991 . . . . . Count 2

8692 *Zale galbanata* (Morr.)
June 12, 1989 . . . . . Count 1

8695 *Zale undularis* (Drury)
June 26, 1989–July 8, 1988 . . . . . Count 3

8697 *Zale minerea* (Gn.)
May 30, 1991–July 15, 1988 . . . . . Count 20

8704+ *Zale helata* (Sm.)
June 19, 1989 . . . . . Count 1

8716 *Zale unilineata* (Grt.)
May 18, 1988–June 26, 1992 . . . . . Count 13

8717 *Zale horrida* Hbn.
June 19, 1989 . . . . . Count 2

8719 *Euparthenos nubilis* (Hbn.)
June 12, 1989–Aug. 16, 1991 . . . . . Count 11

8721 *Allotria elonympha* (Hbn.)
June 12, 1989–July 19, 1991 . . . . . Count 6

8727 *Parallelia bistriaris* Hbn.
June 12, 1989–Aug. 19, 1988 . . . . . Count 13

8738+ *Caenurgina crassiuscula* (Haw.)
July 8–Sep. 24, 1988 . . . . . Count 10

8745 *Mocis texana* (Morr.)
June 15, 1988 . . . . . Count 1

8747 *Celiptera frustulum* Gn.
June 19, 1989 . . . . . Count 1

8778 *Catocala habilis* Grt.
July 26, 1991–Sep. 2, 1989 . . . . . Count 3

8779 *Catocala serena* Edw.
Sep. 9, 1989 . . . . . Count 2

8785 *Catocala residua* Grt.
Aug. 7, 1989–Sep. 25, 1992 . . . . . Count 3

8788 *Catocala retecta* Grt.
Aug. 24–Sep. 21, 1990 . . . . . Count 6

8795 *Catocala palaeogama* Gn.
July 19, 1991–Sep. 10, 1992 . . . . . Count 20

8797 *Catocala subnata* Grt.
July 29, 1988–Sep. 4, 1992 . . . . . Count 3

8798 *Catocala neogama* (J.E. Smith)
Aug. 5, 1988–Sep. 21, 1990 . . . . . Count 9

8801 *Catocala ilia* (Cram.)
July 8–Sep. 24, 1988 . . . . . Count 11

8802 *Catocala cerogama* Gn.
July 29, 1988–Sep. 9, 1989 . . . . . Count 9

8803 *Catocala relicta* Wlk.
Aug. 5–Sep. 10, 1988 . . . . . Count 4

8805 *Catocala unijuga* Wlk.
July 22, 1988 . . . . . Count 1

8834 *Catocala amatrix* (Hbn.)
Sep. 21, 1990 . . . . . Count 1

8846 *Catocala sordida* Grt.
July 29, 1988–July 31, 1989 . . . . . Count 3

8857 *Catocala ultronia* (Hbn.)
July 19, 1991–Sep. 9, 1989 . . . . . Count 28

8858 *Catocala crataegi* Saund.
July 8–Aug. 5, 1988 . . . . . Count 6

8863 *Catocala mira* (Grt.)
July 29, 1988–Aug. 21, 1989 . . . . . Count 8

8864 *Catocala grynea* (Cram.)
July 19, 1991–Sep. 9, 1989 . . . . . Count 21

8867 *Catocala blandula* Hulst
July 15, 1988 . . . . . Count 1

8878.1 *Catocala lineella* Grt.
July 31–Sep. 9, 1989 . . . . . Count 5

8887 *Trichoplusia ni* (Hbn.)
Sep. 13, 1991 . . . . . Count 1

8898 *Allagrapha aerea* (Hbn.)
May 30, 1991–Sep. 7, 1990 . . . . . Count 20

8899 *Pseudeva purpurigera* (Wlk.)
July 3, 1992–July 13, 1990 . . . . . Count 3

8908 *Autographa precationis* (Gn.)
May 25, 1988–Sep. 25, 1992 . . . . . Count 30

8924 *Anagrapha falcifera* (Kby.)
May 28, 1992–Sep. 21, 1990 . . . . . Count 19

8952 *Plusia contexta* Grt.
Sep. 21, 1990 . . . . . Count 1

8955 *Marathyssa inficita* (Wlk.)
June 26, 1989–Aug. 19, 1988 . . . . . Count 6

8957 *Paectes oculatrix* (Gn.)
June 8–Aug. 9, 1990 . . . . . Count 11

8968 *Eutelia pulcherrima* (Grt.)
June 1, 1990 . . . . . Count 1

8970 *Baileya ophthalmica* (Gn.)
May 30, 1991–Aug. 16, 1990 . . . . . Count 14

8971 *Baileya dormitans* (Gn.)
May 28, 1992–Sep. 7, 1990 . . . . . Count 49

8972 *Baileya levitans* (Sm.)
June 1–July 27, 1990 . . . . . Count 12

8973 *Baileya australis* (Grt.)
July 8, 1988–July 10, 1989 . . . . . Count 2

8983 *Megamola minuscula* (Zell.)
June 8–June 22, 1990 . . . . . Count 4

8983.1 *Megamola phylla* (Dyar)
June 5–June 12, 1992 . . . . . Count 2

8990 *Nola cilicoides* (Grt.)
May 30, 1991 . . . . . Count 1

9037 *Hyperstrotia pervertens* (B. & McD.)
June 6, 1991–July 24, 1989 . . . . . Count 29

9040 *Hyperstrotia secta* (Grt.)
June 26, 1989–July 13, 1990 . . . . . Count 5

9047 *Lithacodia muscosula* (Gn.)
May 30, 1991–Aug. 27, 1992 . . . . . Count 26

9048 *Lithacodia albidula* (Gn.)
July 3, 1992–July 26, 1991 . . . . . Count 3

9051 *Lithacodia musta* (G. & R.)
July 19, 1991–Sep. 7, 1990 . . . . . Count 2

9053 *Pseudeustrotia carneola* (Gn.)
May 30, 1991–Sep. 10, 1988 . . . . . Count 239

9055.1 *Maliattha synochitis* (G. & R.)
May 30, 1991–July 24, 1992 . . . . . Count 28

9057 *Homophoberia apicosa* (Haw.)
Aug. 19, 1988 . . . . . Count 1

9062 *Cerma cerintha* (Tr.)
May 30, 1991–July 24, 1989 . . . . . Count 12

9065 *Leuconycta diphteroides* (Gn.)
June 6, 1991–Aug. 21, 1989 . . . . . Count 19

9090 *Tarachidia candefacta* (Hbn.)
June 5, 1992–Sep. 10, 1988 . . . . . Count 36

9095 *Tarachidia erastrioides* (Gn.)
June 12, 1989–Aug. 31, 1990 . . . . . Count 18

9182 *Panthea furcilla* (Pack.)
June 29–Aug. 24, 1990 . . . . . Count 8

9185 *Colocasia propinquilinea* (Grt.)
May 14–July 24, 1989 . . . . . Count 64

9189 *Charadra deridens* (Gn.)
Aug. 14, 1989 . . . . . Count 1

9193 *Raphia frater* Grt.
June 15, 1988–July 10, 1989 . . . . . Count 10

9200 *Acronicta americana* (Harr.)
June 6, 1991–July 24, 1989 . . . . . Count 27

9203 *Acronicta dactylina* Grt.
July 27, 1990 . . . . . Count 1

9219 *Acronicta connecta* Grt.
Aug. 24, 1990 . . . . . Count 1

9229 *Acronicta hasta* Gn.
June 8–Aug. 24, 1990 . . . . . Count 16

9235 *Acronicta spinigera* Gn.
May 21, 1989–July 22, 1988 . . . . . Count 26

9236 *Acronicta morula* G. & R.
May 30, 1991 . . . . . Count 2

9237 *Acronicta interrupta* Gn.
Aug. 24, 1990 . . . . . Count 1

9238 *Acronicta lobeliae* Gn.
Aug. 7, 1992 . . . . . Count 1

9243 *Acronicta ovata* Grt.
June 15, 1988–Aug. 7, 1992 . . . . . Count 7

9244 *Acronicta modica* Wlk.
June 15, 1988–June 26, 1989 . . . . . Count 3

9245+ *Acronicta haesitata* (Grt.)
May 30, 1991–July 22, 1988 . . . . . Count 70

9251 *Acronicta retardata* (Wlk.)
June 12, 1989–June 27, 1991 . . . . . Count 6

9254 *Acronicta afflicta* Grt.
June 22, 1988 . . . . . Count 1

9258 *Acronicta sperata* Grt.
June 1, 1990 . . . . . Count 1

9261 *Acronicta impressa* Wlk.
June 8, 1988–Aug. 3, 1990 . . . . . Count 2

9272 *Acronicta oblinita* (J.E. Smith)
Aug. 3, 1990 . . . . . Count 1

9280 *Simyra henrici* (Grt.)
June 1, 1990 . . . . . Count 1

9285 *Polygrammate hebraeicum* Hbn.
June 15–July 29, 1988 . . . . . Count 13

9301 *Eudryas grata* (F.)
June 6, 1991–Aug. 9, 1990 . . . . . Count 46

9314 *Alypia octomaculata* (F.)
July 15, 1988 . . . . . Count 1

9328 *Apamea nigrior* (Sm.)
June 26, 1992 . . . . . Count 1

9329 *Apamea cariosa* (Gn.)
Aug. 5, 1988–Aug. 9, 1990 . . . . . Count 4

9331 *Apamea cristata* (Grt.)
July 5, 1991 . . . . . Count 1

9344 *Apamea plutonia* (Grt.)
June 15, 1988 . . . . . Count 1

9348 *Apamea amputatrix* (Fitch)
July 24, 1989 . . . . . Count 1

9364 *Apamea sordens* (Hufn.)
June 1, 1990–June 15, 1988 . . . . . Count 2

9367 *Apamea dubitans* (Wlk.)
July 27–Sep. 7, 1990 . . . . . Count 4

9391 *Luperina passer* (Gn.)
July 6, 1990 . . . . . Count 1

9404 *Oligia modica* (Gn.)
July 20, 1990–Sep. 6, 1991 . . . . . Count 19

9406 *Oligia fractilinea* (Grt.)
June 12, 1992–Sep. 2, 1989 . . . . . Count 6

9410 *Oligia crytora* (Franc.)
June 22, 1988 . . . . . Count 1

9419 *Oligia mactata* (Gn.)
Sep. 24, 1988 . . . . . Count 3

9427 *Meropleon diversicolor* (Morr.)
Aug. 9–Sep. 7, 1990 . . . . . Count 3

9453 *Celaena reniformis* (Grt.)
Sep. 9, 1989–Sep. 21, 1990 . . . . . Count 2

9454 *Amphipoea velata* (Wlk.)
June 20, 1991–Aug. 5, 1988 . . . . . Count 69

9457+ *Amphipoea americana* (Speyer)
July 6, 1990–Aug. 5, 1988 . . . . . Count 9

9463 *Parapamea buffaloensis* (Grt.)
Aug. 26, 1988 . . . . . Count 1

9471 *Papaipema arctivorens* Hamp.
Sep. 7, 1990–Sep. 13, 1991 . . . . . Count 2

9483 *Papaipema inquaesita* (G. & R.)
Sep. 10, 1988–Sep. 21, 1990 . . . . . Count 4

9485 *Papaipema baptisiae* (Bird)
Sep. 7, 1990–Sep. 24, 1988 . . . . . Count 5

9505 *Papaipema cerussata* (Grt.)
Sep. 24, 1988 . . . . . Count 2

9509 *Papaipema unimoda* (Sm.)
Aug. 19–Sep. 24, 1988 . . . . . Count 5

9520 *Achatodes zeae* (Harr.)
July 15, 1988–Aug. 7, 1992 . . . . . Count 5

9545 *Euplexia benesimilis* McD.
May 30, 1991–Aug. 31, 1990 . . . . . Count 45

9546 *Phlogophora iris* Gn.
June 15, 1988–July 17, 1989 . . . . . Count 4

9547 *Phlogophora periculosa* Gn.
Aug. 14, 1989–Sep. 10, 1988 . . . . . Count 52

9555 *Ipimorpha pleonectusa* Grt.
Aug. 5, 1988–Sep. 7, 1990 . . . . . Count 2

9556 *Chytonix palliatricula* (Gn.)
June 6, 1991–July 31, 1992 . . . . . Count 21

9578 *Hyppa xylinoides* (Gn.)
May 28, 1989–Aug. 27, 1992 . . . . . Count 28

9582 *Nedra ramosula* (Gn.)
Aug. 2, 1991–Sep. 2, 1989 . . . . . Count 2

9618 *Phosphila turbulenta* Hbn.
July 24, 1989–July 29, 1988 . . . . . Count 2

9631 *Callopistria mollissima* (Gn.)
June 12–Aug. 21, 1989 . . . . . Count 23

9638 *Amphipyra pyramidoides* Gn.
July 31, 1989–Sep. 25, 1992 . . . . . Count 80

9647 *Athetis miranda* (Grt.)
June 12, 1989–Aug. 24, 1990 . . . . . Count 3

9650 *Anorthodes tarda* (Gn.)
May 28, 1989–Sep. 10, 1988 . . . . . Count 15

9661 *Crambodes talidiformis* Gn.
July 10, 1989 . . . . . Count 1

9662 *Balsa malana* (Fitch)
June 15, 1988–Aug. 14, 1989 . . . . . Count 4

9663 *Balsa tristrigella* (Wlk.)
May 30, 1991–July 10, 1992 . . . . . Count 8

9664 *Balsa labecula* (Grt.)
June 22, 1988–July 24, 1992 . . . . . Count 7

9666 *Spodoptera frugiperda* (J.E. Smith)
Sep. 7–Sep. 21, 1990 . . . . . Count 14

9669 *Spodoptera ornithogalli* (Gn.)
Aug. 26, 1988–Sep. 14, 1990 . . . . . Count 3

9678 *Elaphria versicolor* (Grt.)
June 26, 1989–July 15, 1988 . . . . . Count 4

9681 *Elaphria festivoides* (Gn.)
June 15, 1990–July 10, 1992 . . . . . Count 7

9688 *Galgula partita* Gn.
June 8, 1990–Sep. 13, 1991 . . . . . Count 18

9689 *Perigea xanthioides* Gn.
June 6, 1991–Sep. 9, 1989 . . . . . Count 6

9690 *Condica videns* (Gn.)
July 29, 1988 . . . . . Count 1

9696 *Condica vecors* (Gn.)
June 1–Aug. 24, 1990 . . . . . Count 15

9720 *Ogdoconta cinereola* (Gn.)
June 12, 1989–Sep. 13, 1991 . . . . . Count 12

9815 *Cosmia calami* (Harv.)
July 12, 1991–July 31, 1992 . . . . . Count 6

9818 *Amolita fessa* Grt.
June 27, 1991–July 10, 1989 . . . . . Count 3

9886 *Lithophane patefacta* (Sm.)
Sep. 21, 1990 . . . . . Count 1

9889 *Lithophane petulca* Grt.
Sep. 21, 1990 . . . . . Count 1

9957 *Sunira bicolorago* (Gn.)
Sep. 21, 1990–Sep. 25, 1992 . . . . . Count 16

9961 *Anathix ralla* (G. & R.)
Aug. 5, 1988–Sep. 25, 1992 . . . . . Count 164

9989 *Sutyna privata* (Wlk.)
Sep. 7, 1990 . . . . . Count 1

10059 *Homohadena badistriga* (Grt.)
June 27, 1991–July 8, 1988 . . . . . Count 2

10202 *Cucullia convexipennis* G. & R.
July 4–Aug. 21, 1989 . . . . . Count 2

10276 *Polia imbrifera* (Gn.)
June 20, 1991–July 15, 1988 . . . . . Count 11

10288+ *Polia detracta* (Wlk.)
May 30, 1991–Aug. 5, 1988 . . . . . Count 271

10292 *Melanchra adjuncta* (Gn.)
June 22–Aug. 19, 1988 . . . . . Count 7

10293 *Melanchra picta* (Harr.)
July 26, 1991–Aug. 31, 1990 . . . . . Count 2

10299 *Lacanobia subjuncta* (G. & R.)
June 8, 1988 . . . . . Count 1

10300 *Spiramater grandis* (Gn.)
Aug. 30, 1991 . . . . . Count 1

10304 *Trichordestra legitima* (Grt.)
Aug. 14, 1989 . . . . . Count 1

10368 *Lacinipolia meditata* (Grt.)
Aug. 7, 1992 . . . . . Count 1

10397 *Lacinipolia renigera* (Steph.)
May 30, 1991–Sep. 24, 1988 . . . . . Count 124

10405 *Lacinipolia lorea* (Gn.)
June 6, 1991–July 4, 1989 . . . . . Count 17

10436 *Aletia oxygala* (Grt.)
Aug. 31–Sep. 7, 1990 . . . . . Count 4

10438 *Pseudaletia unipuncta* (Haw.)
May 14, 1989–Sep. 25, 1992 . . . . . Count 109

10440 *Leucania linita* Gn.
July 19–July 26, 1991 . . . . . Count 2

10444+ *Leucania phragmatidicola* Gn.
June 12, 1992–Sep. 24, 1988 . . . . . Count 35

10446+ *Leucania multilinea* Wlk.
May 30, 1991–Sep. 2, 1989 . . . . . Count 21

10447 *Leucania commoides* Gn.
July 19, 1991–Aug. 9, 1990 . . . . . Count 4

10461+ *Leucania ursula* (Fbs.)
May 30, 1991–Sep. 14, 1990 . . . . . Count 208

10495+ *Orthosia hibisci* (Gn.)
May 21, 1989 . . . . . Count 3

10501 *Crocigrapha normani* (Grt.)
May 14, 1989–June 8, 1990 . . . . . Count 25

10521 *Morrisonia confusa* (Hbn.)
May 28–June 4, 1989 . . . . . Count 3

10521.1 *Morrisonia latex* (Gn.)
May 30, 1991–July 17, 1992 . . . . . Count 45

10524 *Nephelodes minians* Gn.
Aug. 26–Sep. 24, 1988 . . . . . Count 18

10532 *Homorthodes furfurata* (Grt.)
June 27, 1991–Aug. 7, 1992 . . . . . Count 40

10578 *Pseudorthodes vecors* (Gn.)
June 4, 1989–Sep. 10, 1988 . . . . . Count 59

10585 *Orthodes crenulata* (Butler)
June 8, 1988–Sep. 7, 1990 . . . . . Count 11

10587 *Orthodes cynica* Gn.
May 30, 1991–July 31, 1992 . . . . . Count 321

10627 *Tricholita signata* (Wlk.)
June 27, 1991–Sep. 24, 1988 . . . . . Count 5

10663 *Agrotis ipsilon* (Hufn.)
May 30, 1991–Sep. 25, 1992 . . . . . Count 121

10674+ *Feltia subgothica* (Haw.)
July 31, 1989–Aug. 30, 1991 . . . . . Count 16

10676 *Feltia herilis* (Grt.)
July 31, 1989–Sep. 13, 1991 . . . . . Count 11

10698.2 *Trichosilia geniculata* (G. & R.)
Sep. 7, 1990 . . . . . Count 1

10705 *Euxoa messoria* (Harr.)
July 10, 1992 . . . . . Count 1

10793 *Euxoa scholastica* McD.
June 20, 1991–July 31, 1989 . . . . . Count 4

10803 *Euxoa velleripennis* (Grt.)
Sep. 9, 1989 . . . . . Count 2

10891 *Ochropleura plecta* (L.)
May 18, 1988–Sep. 9, 1989 . . . . . Count 137

10903+ *Euagrotis illapsa* (Wlk.)
June 22, 1990–Aug. 30, 1991 . . . . . Count 2

10915 *Peridroma saucia* (Hbn.)
July 17, 1989–Sep. 24, 1988 . . . . . Count 8

10942.1+ *Xestia dolosa* Franc.
May 30, 1991–Sep. 25, 1992 . . . . . Count 857

10943 *Xestia normaniana* (Grt.)
Aug. 5, 1988–Sep. 14, 1990 . . . . . Count 116

10944 *Xestia smithii* (Snell.)
Aug. 19, 1988–Sep. 25, 1992 . . . . . Count 22

10950+ *Xestia bicarnea* (Gn.)
Aug. 16, 1990–Sep. 10, 1988 . . . . . Count 28

10955 *Xestia badinodis* (Grt.)
Sep. 21, 1991–Sep. 24, 1988 . . . . . Count 3

11000 *Anaplectoides prasina* (D. & S.)
July 31, 1989 . . . . . Count 1

11006 *Protolampra brunneicollis* (Grt.)
June 15, 1988–Aug. 31, 1990 . . . . . Count 9

11007+ *Eueretagrotis sigmoides* (Gn.)
June 20, 1991 . . . . . Count 1

11010 *Heptagrotis phyllophora* (Grt.)
June 22, 1988 . . . . . Count 1

11029+ *Abagrotis alternata* (Grt.)
June 29, 1990–Sep. 25, 1992 . . . . . Count 81

11068 *Helicoverpa zea* (Boddie)
Sep. 9, 1989–Sep. 21, 1990 . . . . . Count 16